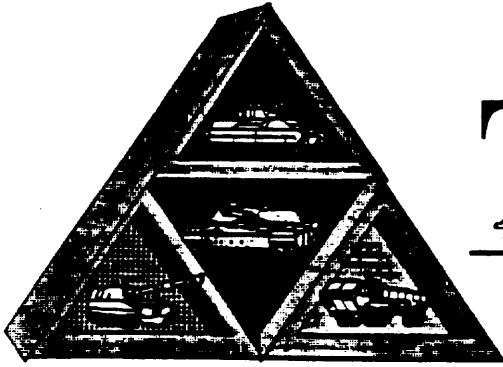


TARDEC



Technical Report

No. 13606

Evaluation of NDI Compressed Air Foam System (CAFS) Applied as a Retrofit

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Section III Feasibility Evaluation ---

FEASIBILITY OF RETROFITTING CAFS

Retrofitting CAFS to an in-service pumper appears to be too costly in terms of dollars and time; the apparatus is out of service during the retrofit. Three experienced, motivated maintenance personnel with virtually unlimited equipment had a great deal of difficulty over a 6 month period applying the equipment recommended. It might have proved less costly to gut the pumper by removing the pump, tank and the plumbing, including drive train, to rebuild the pumper with the necessary components for CAFS.

There cannot be a recommendation for retrofitting CAFS technology to in-service Army apparatus without a pre-configured kit that can be quickly and efficiently applied to provide CAFS capability.

FEASIBILITY OF CAFS

The CAFS technology was evaluated in a Class B and a Class A scenario. Despite initial equipment difficulties the capability of CAFS generated AFFF to effect exposure protection for fire threatened collapsible fuel tanks was significant. CAFS generated foam in structural fire fighting compared to water proved to be far superior. In all evolutions CAFS proved to be capable of knocking the fire down faster, using less water, reducing the weight of the hose and increasing discharge distance over standard equipment. The foam could be made to stick to overhangs, vertical surfaces such as walls, and to ceilings thereby improving the cooling effect of the water. The CAFS generated foam successfully exhibited all three primary technological characteristics and provided superior fire suppression and protection.

The results of the evaluation are a strong recommendation for CAFS technology, whether for use in TDA fire departments protecting post, camps and stations, municipal fire departments or the Engineer Firefighting Detachments.

Section IV Conclusion

The results of the CRADA support two conclusions. The first is retrofitting CAFS technology to in-service Army fire trucks is not cost effective without a complete, easy-to-install kit. If a kit is developed it should be a “universal” type, capable of fitting the myriad of fire trucks in the Army inventory. No kit exists at this time.

The second conclusion is that CAFS technology provides firefighters with much improved capability to fight fires by increasing the distance of discharge, reducing water requirements and increasing the cooling ability of water by causing the foam to adhere to burning or exposed fuels. Hose line weight is significantly reduced thus mitigating one of the primary physical stressors of fire fighting. Fire trucks could be smaller without losing total firefighting capability. CAFS technology can be built into new trucks for about 15% of the base truck price.

Section V Recommendations

Based on the results and conclusions of this evaluation, it is the unanimous recommendation of the project members of the CRADA that CAFS technology would significantly improve the performance of most fire trucks and should be considered in all future fire truck procurements. The technology is simple enough when engineered into the truck at the outset of design, and effective enough in extinguishing fires to be of great value. The performance of CAFS could be improved by additional research to refine or improve the characteristics of CAFS.

NOTES AND OPINIONS

There is no question that additional research is required to bring firefighting into the 21st century. We are still fighting fires in the same manner as when fire was discovered - lots and lots of water. We are not questioning the role of water as the chief agent for fire suppression, rather its effectiveness as it is being used. Conclusive proof from many legitimate sources such as the National Fire Protection Association, Factory Mutual Research Corporation and others, show 80% of the damage in a fire is caused by the massive amounts of water rather than the fire. The deaths and injuries associated with fire incidents are directly attributable to the fire. We must find a better way. We can learn it the hard way on the fire ground, incident by incident; or we can learn through the agent of research.

The CAFS characteristics result in reduced costs and increased safety for any fire department. For the Engineer Firefighting Detachment's worldwide mission, reducing the amount of water required is critical. These firefighting soldiers have the ability to protect and deploy forces but lack appropriate equipment.

The project members are in accord regarding the importance technology must play in fire protection. The fire service, Department of Army or civilian sector, has traditionally been slow to accept change giving rise to the adage "150 years of dedicated service unhampered by progress". Fire departments can no longer rely on the proximity and availability of another engine company when they get into trouble. Fire departments and emergency personnel can no longer rely on unending budget streams, either. They can no longer knock the door down and pummel the contents with hose streams pushing 250 gallons per minute at 125 psi. The handwriting is on the wall - becoming more efficient, effective and safer isn't a better way to do business, it is the only way to stay in business.

Our conclusions, particularly the second, should not be construed to indicate that Army fire departments can operate with less personnel or that fewer firefighters would be required on the fire ground where CAFS equipment is present. Fires in structures

designed for living or those that have high occupancy, require four firefighters - one at the pump panel, two on the hose and one to direct the operation and otherwise assist in rescues, hose lays or the myriad of actions that may be necessary to save lives and protect property from fire damage.

There is no question that CAFS reduces water requirements and provides faster knockdown. There is no question that CAFS also prevents reignition as well as initial ignition of exposures. Sadly, there is no question that education of personnel involved in this very special and dangerous field, at all levels, is urgently needed to prevent the loss of one more building, the loss of one more valuable acre of wildland and the loss of one more precious life.